

I/WE CLAIM:

1. A cooking appliance comprising:
an oven cavity having an upper portion; and
a convection heating system positioned to deliver a convective air flow into the oven cavity, said convection heating system including:
a housing including an interior chamber, an inlet portion, and an outlet portion opening to the oven cavity, each of said inlet portion and said outlet portion being fluidly connected to the interior chamber;
a fan rotatably mounted in the interior chamber; and
an exhaust outlet portion having a first end portion opening to the interior chamber, a second end portion exposed to a surrounding environment, and an intermediate portion, said exhaust outlet portion being provided with a plurality of vent openings sized to establish a controlled control a flow rate of exhaust gases discharged from the interior chamber of the convection heating system.
2. The cooking appliance according to claim 1, further comprising: a heating element positioned within the interior chamber.
3. The cooking appliance according to claim 2, wherein the heating element is arranged radially outwardly of the fan.
4. The cooking appliance as recited in claim 3, wherein the exhaust outlet portion is positioned radially outwardly of the fan, adjacent to the heating element.

5. The cooking appliance as recited in claim 1, further comprising: a restrictor plate positioned in the exhaust outlet portion, with said restrictor plate being formed with the plurality of vent openings.

6. The cooking appliance as recited in claim 1, wherein the housing includes an outer peripheral rim and a central portion, wherein the outlet portion of the housing includes a plurality of openings arranged in the outer peripheral rim of the housing and exposed to the oven cavity.

7. The cooking appliance according to claim 6, wherein the inlet portion of the housing includes a plurality of inlet openings arranged about the central portion, said plurality of inlet openings being adapted to receive an oven air flow from the oven cavity to within the interior chamber of the housing.

8. The cooking appliance as recited in claim 6, further comprising: a broil element extending within the oven cavity, said broil element being carried by the housing.

9. The cooking appliance as recited in claim 8, wherein the broil element has a first end portion having a generally spiral shape, a second end portion having a generally spiral shape, and an intermediate, generally S-shape portion interconnecting the first and second end portions.

10. The cooking appliance as recited in claim 3, wherein the heating element is constituted by a sheathed electric resistive heating element defining a plurality of ring portions.

11. The cooking appliance as recited in claim 1, wherein the convection heating system is mounted on the upper portion of the oven cavity.
12. The cooking appliance as recited in claim 1, further comprising: a peripheral wall provided in the interior chamber between the fan and the exhaust outlet portion, said peripheral wall dividing the interior chamber during operation of the convection heating system, into an inner, high pressure chamber and an outer, lower pressure chamber.
13. The cooking appliance as recited in claim 12, wherein the inlet portion opens to the low pressure chamber.
14. The cooking appliance as recited in claim 13, wherein the exhaust outlet portion is open to the high pressure chamber.
15. The cooking appliance as recited in claim 2, further comprising: a microwave cooking system adapted to introduce microwaves into the oven cavity.
16. A convection heating system for a cooking appliance comprising:
 - an oven cavity; and
 - a convection heating system positioned to deliver a convective air flow into the oven cavity, said convection heating system including:
 - a housing including an interior chamber, an inlet portion, and an outlet portion opening to the oven cavity, each of said inlet portion and said outlet portion being fluidly connected to the interior chamber;
 - a fan rotatably mounted in the interior chamber;

an exhaust outlet portion having a first end portion opening to the interior chamber, a second end portion exposed to a surrounding environment, and an intermediate portion, said exhaust outlet portion being provided with a plurality of vent openings sized to establish a controlled flow rate of exhaust gases discharged from the interior chamber of the convection heating system.

17. The convection heating system as recited in claim 16, further comprising: a heating element positioned within the interior chamber.

18. The convection heating system as recited in claim 17, wherein the heating element is arranged radially outwardly of the fan.

19. The convection heating system as recited in claim 18, wherein the exhaust outlet portion is positioned radially outwardly of the fan, adjacent to the heating element.

20. The convection heating system as recited in claim 16, further comprising: a restrictor plate positioned in the exhaust outlet portion, with said restrictor plate being formed with the plurality of vent openings.

21. The convection heating system as recited in claim 16, further comprising: a broil element extending within the oven cavity, said broil element being carried by the housing.

22. The convection heating system as recited in claim 21, wherein the broil element has a first end having a generally spiral shape, a second end

having a generally spiral shape, and an intermediate, generally S-shape portion interconnecting the first and second ends.

23. The convection heating system as recited in claim 16, further comprising: a peripheral wall provided in the interior chamber between the fan and the exhaust outlet portion, said peripheral wall dividing the interior chamber during operation of the convection heating system, into an inner, high pressure chamber and an outer, lower pressure chamber.

24. The convection heating system as recited in claim 23, wherein the inlet portion opens to the low pressure chamber.

25. The convection heating system as recited in claim 24, wherein the exhaust outlet portion is open to the high pressure chamber.

26. A method of operating a cooking appliance including an oven cavity through which air flows for convection cooking purposes comprising:

- rotating a fan mounted in an interior chamber of a housing;
- drawing in a flow of oven air into the housing upon rotation of the fan;

- creating high and low pressure zones in the interior chamber;
- drawing in a flow of fresh air in the low pressure zone;
- mixing the flow of oven air with the flow of fresh air to create a combined flow of air;

- exhausting a controlled portion of the combined flow of air from the cooking appliance through a plurality of vent openings provided in an exhaust outlet arranged in the high pressure zone; and

directing another portion of the combined flow of air into the oven cavity.

27. The method of claim 26, further comprising: heating the combined flow of air in the high pressure zone of the interior chamber.

28. The method of claim 27, further comprising: positioning a restrictor plate, formed with the plurality of vent openings, in the exhaust outlet to regulate the controlled portion of the combined flow of air.

29. The method of claim 27, further comprising: causing the flow of oven air to be directed radially outwardly of the fan through openings formed in a peripheral wall arranged in the housing between the fan and the exhaust outlet in order to establish the high and low pressure zones.

30. The method of claim 27, further comprising: activating an electric broil element arranged in the oven cavity and carried by the housing.